general dynamics it is the Lagrangian function $L = T - W$ that determines everything, so that, if a part of the energy is reckoned as kinetic energy, it has the opposite sign to what it would have if reckoned as potential energy. The failure to recognise this difference in the two types of energy in the present instance appears to be the cause of much of the confusion in the subject. The usual treatment of the energy relations of the magnetic field gives the same sign to a quantity which in the statical case is treated as potential energy and in the dynamical case as kinetic energy, and this apparent agreement of sign appears to satisfy most authors, so that the real discrepancy has rarely been noticed. The present mode of treatment has actually been suggested by Cohn,* but he rejects it as unsatisfactory, because it leads to opposite signs for kinetic and potential energies. In another place Jeans† comes up against the opposite signs, but reconciles them by finding that one of the expressions compared is incomplete by an amount which makes the signs the same.

On Phenomena relating to the Spectra of Hydrogen and Helium.

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(Abstract.)

In a previous paper the structure of broadened spectrum lines was investigated by a method involving the use of a neutral-tinted wedge as an accessory to the spectroscope. The present communication deals with a method for the accurate determination of the photographic intensities of spectrum lines and the reduction of such intensities to absolute values by comparison with the continuous black-body radiation of the carbon arc.

These methods have been applied to a study of the relative intensity distribution in the spectra of helium and hydrogen under different conditions of excitation.

It has been found that under certain specified conditions there is a transfer of energy from the longer to the shorter wave-lengths in any given series, and that, under such conditions, the associated series, and in particular the Diffuse series, are relatively enhanced at the expense of the Principal series.

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* 'Das Electromagnetische,' p. 300.

† 'Electricity and Magnetism,' p. 432.

It has also been found that the distribution of intensity found in certain celestial spectra can be approximately reproduced in the laboratory.

In any attempt to interpret the phenomena observed in connection with the Balmer series of hydrogen, it is necessary to know the particular type to which this series belongs. In order to decide this point a study has been made of the separations of the components of lines of the Balmer series of hydrogen, and the mean values of the separations of the doublets constituting the lines H_α and H_β have been found to be respectively 0·132 Å.U. and 0·033 Å.U. These values are consistent with the separations appropriate to a Principal series, and the first is in precise agreement with the value deduced by Buisson and Fabry.

These results have been obtained by crossing a Lummer Gehrcke plate with the neutral wedge, and submitting the contours obtained to mathematical analysis, by means of which the distribution of intensity in the individual components, and the separation of the components, can be determined.